

EXHIBIT 1



Exponent
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April 28, 2025

John D. Papageorge
Partner
Taft
One Indiana Square, Suite 3500
Indianapolis, Indiana 46204-2023

Re: Nelson v Forest River
Exponent Project Number: 2409104.000

Dear Mr. Papageorge:

Pursuant to your request, Exponent has reviewed the Plaintiff's Expert reports by Dr. Folkers Rojas and Dr. Matthew Angle regarding two vehicles purchased by Mr. Jay Nelson, the 2019 Forest River Palomino Puma 5th wheel, Model: PUF295BHSS, (VIN: 4X4FPUF28KP079346) and the 2020 Puma PUF29BHSS (VIN: 4X4FPUF22LP084415). Both reports provided opinions regarding Forest River with little regard for the circumstances of the two incidents on the two vehicles owned by Mr. Nelson. This report has been prepared to discuss the Plaintiff's expert reports.

1. Review of the report by Folkers Rojas

- 1.1. Dr. Rojas states that the Nelson vehicle caught fire on page 4, which is a mischaracterization of the events, as there was smoke from resistive heating that was the result of the excessive tension applied by Mr. Nelson the 7-way plug and the consequential short circuit.

15. On May 29, 2020, the 2019 Puma belonging to Jay Nelson caught fire.

- 1.2. The reference to the response by Chad Wenger, as memorialized by an email to Gretchen Gonzalez, was relied upon by Dr. Rojas on page 5, to conclude that the crimp was insufficient.

16. On June 2, 2022, at 9:43 AM, Chad Wenger (D&D Warranty manager) sent an email to Gretchen Gonzalez, the Forest River Puma warranty manager, notifying her that "It looks to me as a connector in the junction box was not crimped properly for the charge line and that caused the short and fire."

The statement by Chad Wenger was likely a response that would result in Forest River paying for the repair and not based on information that Mr. Wenger would be able to surmise after that excessive force applied to the 7-way cord. The crimp would not be capable of withstanding the unreasonably excessive tension produced by the misuse of the 7-way cord by Mr. Nelson.

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- 1.3. Forest River, out of an abundance of caution, launched the 2022 survey to determine the root cause of the alleged non-compliance. Dr. Rojas finds fault with Forest River for not immediately notifying NHTSA of the results of the survey on page 6 of his report. The release of survey information to NHTSA is not appropriate communication with NHTSA, which Dr. Rojas would know if he had any experience with on-road vehicle standards and how the recall or notification process works.
- 1.4. The release of a recall on June 4, 2024, was Forest River acting in good faith, as a responsible manufacturer to address issues in the field for production vehicles.
- 1.5. The field investigation launched by Jay Nelson's counsel and executed by Dr. Rojas and Dr. Angle was conducted under false pretenses to the dealers without informing the dealers of their true intent regarding the investigation. The protocol was ill-defined and did not include clear criteria for any type of determination. There was no information provided that would allow for any type of review or validation of their methodologies, criteria, or protocol for the vehicles investigated or even their location or contact information to verify their investigation. The trier of fact is left with trusting their observations and conclusions as factual.
- 1.6. Dr. Rojas and Dr. Angle proceeded to inspect the two (2) Nelson vehicles that resulted in the rewiring of the 2019 Puma, as stated on page 6.

26. In November 2024, the 2019 Puma underwent an inspection to review its wiring and examine Forest River's theories, and the 2020 Puma was also inspected. During the inspection of the 2019 Puma, we rewired it to comply with applicable standards.

- 1.7. The first retained expert by Mr. Nelson was Don Wirtz. Mr. Wirtz continued to modify the 7-way cord installation to "comply" with the standard. The modification conducted by Mr. Wirtz was different than the modification to "comply" executed by Dr. Rojas and Dr. Angle.

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- 1.8. Dr. Rojas states on page 10 of his report that Forest River has been put on notice via warranty claims:

39. Forest River has repeatedly been put on notice via the warranty claims that the seven-way wiring violates applicable standards. Despite being on notice of the problem well before the 2022 Survey, no root cause analysis was performed, nor was any change made.

It is clear the Dr. Rojas has no concept of warranty claim data nor the sheer volume of warranty claim information that is presented on a weekly basis in a large-scale manufacturing industry. Warranty claims are submitted and analyzed in much the same manner as a Failure Modes and Effects Analysis (FMEA). The items that are flagged as issues to resolve are based on the number of occurrences, the severity of the issues, the detectability of the issue, and the costs involved. In a basic FMEA, the 7-way power cord issues do not resonate with the warranty data produced. The bottom line on this is that over the twenty-year history of the product occurrences that have produced an issue regarding potential customer safety, this issue has not resulted in any significant risk or safety concern for the consumer, despite the purposeful attempt by Plaintiff's experts to relegate any thermal event that has ever been reported as being caused by the 7-way power cord circuit despite having no relevant basis. There simply has not been any record that this is an issue to Forest River consumers. This has only been raised as a concern to mask Plaintiff's failure to use and operate the Forest River product in a reasonable and appropriate manner. If Mr. Nelson had not subjected his two (2) Forest River products to such an extreme tensile force as to cause the wiring to traverse an estimated 8 to 12 inches of travel from their original configuration, this would not be an issue of discussion.

- 1.9. Dr. Rojas draws several conclusions that culminate on page 12 with the opinion that 1.2 million vehicles need to be repaired from over 20 years of production. This number of vehicles is baseless and without merit.
- 1.10. Further discussion on page 12 of Dr. Rojas report references damages estimates for which Dr. Rojas is not qualified to provide these opinions. Extrapolating information from a survey in 2022, with attempted application to twenty years of production, is highly speculative and not likely to produce a reasonable conclusion. He has no training or experience in damages estimation, based on his Curriculum Vitae provided in Exhibit A of his report.
- 1.11. Dr. Rojas refers to the second sticker, on page 14 of his report, as also stating that compliance with the standards was misleading. This is incorrect, as the second sticker refers to the Federal Motor Vehicle Safety Standards (FMVSS), 49 CFR 571.101-500. This demonstrates a lack of understanding of vehicles and the standards applicable to recreational vehicles.

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- 1.12. The Shasta recall referenced on page 15 of Dr. Rojas' report involves a circuit breaker between the RV battery and the converter. This recall is irrelevant to any aspect of the 7-way cord.
- 1.13. Dr. Rojas presented a series of recalls from the RV industry that had nothing to do with the 7-way power cord and further distracted the focus from the negligence of Mr. Nelson with his two (2) Puma 5th wheels.
 - 1.13.1. The 2016 Jayco recall, 16V-230 referenced on page 15, was in response to moving the battery on a travel trailer from the A-frame to a side battery box, much like a 5th wheel.
 - 1.13.2. The 2024 Brinkley RV recall, 24V-476 referenced on page 16, involves wiring to a mini circuit breaker inside the RV. This recall is irrelevant to any aspect of the 7-way cord.
 - 1.13.3. The 2024 Airstream recall, 24V-432 referenced on page 16, pertained to the back-up power for the water heater/furnace. This recall is irrelevant to any aspect of the 7-way cord.
- 1.14. Dr. Rojas on page 29 mentions the King fire that resulted in a fatality and also the 7-way cord in an attempt to relate the two. The same paragraph states that the fire investigation was inconclusive. The grouping of this information is deceptive and misleading to the trier of fact.
- 1.15. Dr. Rojas stated on page 38 that the travel trailer electrical diagram ForestRiver0005021 is incorrect regarding method #3. The diagram is consistent with the reasonable interpretation held by RVIA and Forest River that the over current protection is not required prior to entering the vehicle for a travel trailer or pop-up. The wiring that is external to the vehicle is observable and it is not in an area that includes flammable material and does not put the travel trailer or pop-up at risk of a fire. The surrounding material is carbon steel. The RVIA auditors and the Forest River personnel have been consistent with this interpretation.
- 1.16. Dr. Rojas from pages 41 to 47 proceeds to draw conclusions on the entire history of a vehicle build for every plant over 20 years, based on a 2022 spot survey initiated by a responsible manufacturer, to extrapolate the spot survey to every vehicle ever made by Forest River.

The discussion culminated in a series of charts that had no legend or criteria used, as well as a flame icon for dramatic affect with no explanation of the meaning of the chart and data provided.

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- 1.17. Page 79 incorrectly states the Forest River allegation.

180. Forest River alleges Jay Nelson damaged the seven-way wiring by driving off the tow vehicle without disconnecting the 7-way plug or by taking too tight of a turn. Conway based this theory on a crooked junction box. As far as the crooked junction box with only one screw — it does not comport with the physics of this incident. Moreover, he opined a screw had broken, which is not correct. The inspection of Nelson's 2019 Puma performed on November 13, 2024, shows conclusively that only one screw was used to secure the junction box to the frame.

The statement made in Nelson v Forest River Keough Report on Page 12:

Plaintiff demonstrated consistent negligence in disconnecting the shore power and the 7-way plug cord. The shoreline connection to the 5th wheel trailer was torn out of the wall, as shown in Figure 13, like the way the 7-way junction box was pulled out of position and the connector pulled from the junction box.

A clarification of the statement made was that Mr. Nelson demonstrated consistent negligence regarding tethered connections, based on the clear drive away scenario with the shoreline and the apparent poor routing of the Bargman 7-way cord on two separate Puma 5th wheel trailers.

- 1.18. The statement by Dr. Rojas on page 77 that the negligent events were not true based on the crooked junction box not having a second screw installed is misleading.

180. Forest River alleges Jay Nelson damaged the seven-way wiring by driving off the tow vehicle without disconnecting the 7-way plug or by taking too tight of a turn. Conway based this theory on a crooked junction box. As far as the crooked junction box with only one screw — it does not comport with the physics of this incident. Moreover, he opined a screw had broken, which is not correct. The inspection of Nelson's 2019 Puma performed on November 13, 2024, shows conclusively that only one screw was used to secure the junction box to the frame.

The absence of the second screw and the rotation of the box are not the primary indicators of the excessive abuse of the routing of the 7-way cord. The fact that several inches of wire were pulled through the junction box, with enough force to axially fail the Arlington connector is the primary indicator.

- 1.19. Dr. Rojas disregards the responsibility for the level of abuse of the vehicle by Mr. Nelson on Page 77.

181. Regardless of why or when the push-in connector came out of the junction box, the cause of this fire was a lack of overcurrent protection on the charge line and other seven-way wiring defects.

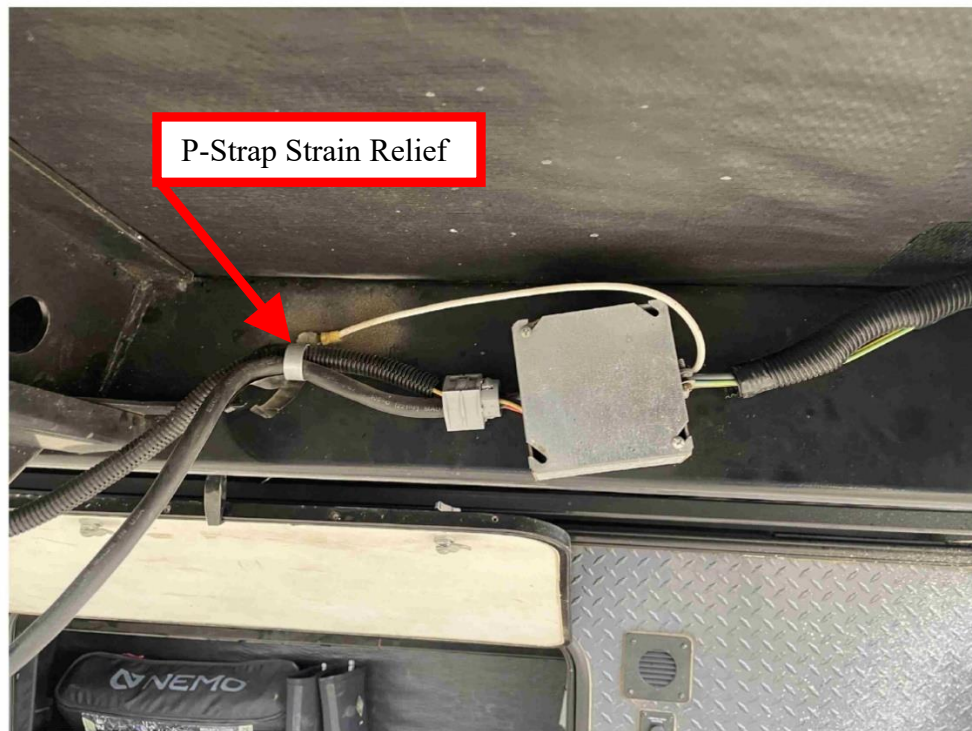
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The cause of the short was not the presence of overcurrent protection, it was completely due to Mr. Nelson's routing and subsequent maneuvers involving the 7-way cord. Regardless of why the wires heated up, the actions of Mr. Nelson resulted in damage to the Forest River Puma 5th wheel that required replacement and repair of several components.

- 1.20. Dr. Rojas on page 78 incorrectly states that the Arlington connector is serving the purpose of strain relief.

185. Thus, Conway does not appear to understand strain relief, and Forest River is using a connector that was not designed for the loading associated with strain relieving a cable. Since Forest River solely uses the Arlington Industry connector (or a similar connector) to provide strain relief, even though it wasn't designed for that, the connector's snap-fit will fail over the life of the RV unit.

The Arlington connector did not fail due to a moment, as it is unable to sustain a moment load with the P-Strap located adjacent to the junction box. The P-Strap serves as strain relief, as shown in Figure 1.



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Figure 1: P-Strap Strain Relief

P-Straps are commonly used as strain relief components, as shown in Figure 2.

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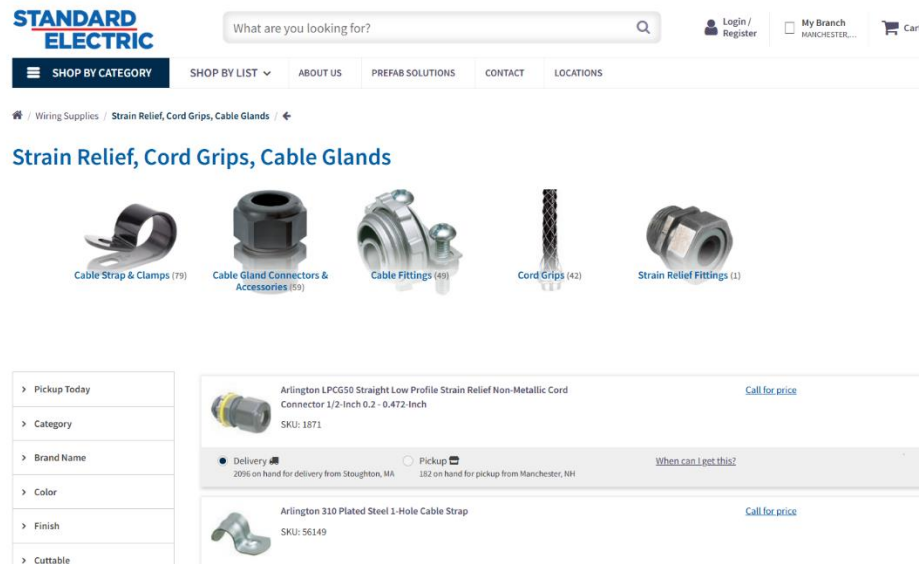


Figure 2: Common Strain Relief Components

<https://www.standardelectric.com/wiring-supplies/strain-relief-cord-grips-cable-glands>

The Arlington connector clearly pulled straight out due to an extreme axial load, which is consistent with the routing of the 7-way cord over the side of the pickup truck side panel followed by a sharp U-turn at the Black Sandy campground.

- 1.21. Dr. Rojas on page 81 with the assistance of Dr. Angle deceptively show the 7-way cord routed over the side panel of the truck bed on the side closest to the 5th wheel trailer. This is not how the cord was routed during the Nelson incident; however, it does demonstrate that the 7-way cord can wrap around outside the truck bed side panel, as shown in Figure 3 (which is Figure 41 in the Rojas report).



Figure 41. Photos of the 7-way cord in different geometric configurations with a vehicle

Figure 3: 7-Way Cord Wrapped Around the Wrong Side of the Truck

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- 1.22. Dr. Rojas on page 82, proposed an alternative design, as shown in Figure 4 (which is Figure 42 in the Rojas report).



Figure 42. Upgrade to the 2019 Puma wiring with a plastic junction box

Figure 4: Proposed Configuration

- 1.23. The force applied on the 7-way cord would likely produce similar results and damage in the proposed plastic junction box with the wire pulling out.
- 1.24. On page 84, Dr. Rojas states that the Arlington connector routinely comes out. There is no basis for claiming the connector routinely comes out and there is further no reason for the connector to come out with the cord through the P-clamp.
- 1.25. Dr. Rojas's and Dr. Angle's experiments on pages 85 through 89, showing a short cause a thermal event that is extremely detectable from the level of smoke generated is sensationalizing a situation that is not occurring in Forest River vehicles over the claimed 20 year period.
- 1.26. On pages 90 through 103, Dr. Rojas further references damages estimates for which Dr. Rojas is not qualified to provide these opinions. Extrapolating information from a survey in 2022, with attempted application to twenty years of production is highly speculative, with extreme uncertainty and not likely to produce a reasonable conclusion. He has no training or experience in damages estimation, based on his Curriculum Vitae provided in Exhibit A of his report.

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- 1.27. Dr. Rojas completes his conclusions on page 104. The following statement regarding the warranty system putting Forest River on notice is misleading.

262. Forest River had ample time in the ~20 years of producing Cedar Creek and ~18 years of producing the Puma model to catch the seven-way wiring defects. In short, the existing Forest River quality control and safety compliance infrastructure were ineffective in protecting the consumer and public from the seven-way wiring defects. There are also multiple warranty claims that put Forest River on notice of the seven-way wiring defects that violate applicable standards.

The number of 7-way wiring warranty claims between 2013 and 2024 in a Forest River 5th Wheel from document ForestRiver0000156.PDF, ForestRiver0030438.PDF, and ForestRiver0030439.Xlsx was 116 claims. The total production of Forest River 5th wheels was 180,079 from document ForestRiver0030445.pdf. The warranty rate for Forest River 5th wheel 7-way wiring warranty claims between 2013 and 2024 was 116 claims/180,079 vehicles produced or 0.064 %.

Based on my 26 years of experience working with warranty claims in the recreational vehicle industry and specialty vehicle industry, a warranty issue becomes subject to a more detailed investigation when the severity, detectability, and prevalence in aggregate present a significant risk. A prevalence indicator would correlate with a warranty rate approaching 1.2%. Forest River would have been alerted to a significant risk if over 2,160 warranty issues had been received. The fact that none of the claims represented injury or significant loss further corroborates the low risk involved.

The warranty data was reviewed with the assistance of Dr. Kristen Lennox, Ph.D. using statistical science, arriving at the conclusion that the occurrences of issues with the 7-way connections were statistically insignificant.

- 1.28. Dr. Rojas on page 104 stated.

263. Forest River's placement of the RVIA Seal and the separate decal, both certifying compliance with applicable standards, is not correct. Forest River has produced towable RVs likely for 20 years that violate applicable standards regarding the seven-way wiring.

This is incorrect, as the separate decal refers to the Federal Motor Vehicle Safety Standards (FMVSS), 49 CFR 571.101-500. This demonstrates a lack of understanding of vehicles and the standards applicable to recreational vehicles.

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2. Review of the report by Matthew Angle

- 2.1. The introduction from pages 11-15 depicts numerous fires and implies that these were in some way related to the 7-way wiring, which is unsubstantiated. There were numerous pictures without reference, let alone any cause and origin identified. Fires can occur for many reasons.

The report states on Page 135, in reference to the images on pages 11-15, that these were the result of the 7-way plug.

The warranty claims document the lack of overcurrent protection on the charge line. Notably, these cases involve trailers that did not suffer complete destruction, meaning they were still repairable. It is reasonable to suspect that many additional incidents resulted in total loss, leaving no trailer behind to report or repair. This is seen in the section above where Forest River towable RVs burned to total destruction.

Dr. Angle completely speculates that there were many total losses that went unreported. This statement is without basis and completely unreasonable.

- 2.2. Dr. Angle refers to the second sticker, Figure 2 of his report, as also stating compliance with the ANSI/NFPA standards. This is incorrect, as the second sticker refers to the Federal Motor Vehicle Safety Standards (FMVSS), 49 CFR 571.101-500. This demonstrates a lack of understanding of vehicles and the standards applicable to recreational vehicles.

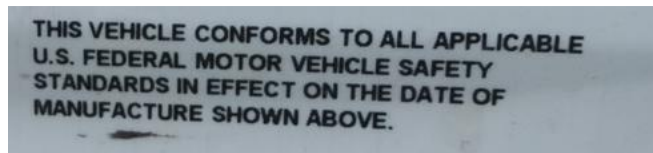


Figure 2: Second sticker on propane tank side of the towable RVs

- 2.3. On Page 19, Dr. Angle claims that an overheating wire will ultimately break the circuit and claims that material surrounding the wire will reach there autoignition temperature. There is no indication of the autoignition temperature of the surrounding materials and there are only steel components in travel trailers and pop-ups, due to the fact the 7-way power cord and the batteries are external to the RV, mounted to the A-Frame.

When an unprotected short occurs, the wire becomes the current-limiting device. With a sufficiently healthy battery and a small enough wire, the wire will first heat to the point that it melts or burns the insulation. Eventually, it develops a hot spot, often at the point where the short is made. As copper heats, its resistance increases. This causes a local hot spot to heat faster than the

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surrounding copper. If left unchecked, this spot will reach 1900°F, causing it to melt and break the conductive path, thus stopping the current.

By the time this hot spot has reached the melting point, insulation and many materials surrounding the wire will have reached their autoignition temperatures, meaning they can ignite.

The comments by the Plaintiff are taken as expert testimony by Dr. Angle, although Mr. Nelson is not qualified to offer this opinion.

As Mr. Nelson testified in his deposition, once towable RVs ignite, “they will catch on fire and burn to the ground in a matter of minutes” (Nelson 57:7-14).

- 2.4. Dr. Angle incorrectly claims that Forest River implies that William Conway is a licensed engineer on Page 35. There is no requirement for a P.E. to hold the position of Chief Corporate Engineer. There is no requirement for a P.E. in the automotive industry. This comment is without basis.
- 2.5. There is continuous mention of a fire on Page 42 of Dr. Angle’s report. There was no fire, only smoke from the melting wire.
- 2.6. The crimping was sufficient to allow the entire wire from both sides of the junction box to be pulled through the box. There are limitations on the amount of force that can be applied to a 7-way cord or any wire. That is the reason for providing force limits by wire gauge in the LV Standard, Section 6-1.2 Tensile Force, as shown in Figure 5. The statement that the wire pulled free of the crimp fitting on page 42 of Dr. Angle’s report is an understatement, as the axial load on the wire from the improper routing of the 7-way cord by Mr. Nelson produced an excessive and unreasonable amount of pull on the cord. It would be difficult to imagine any wire or crimp that could withstand that level of tension without damage.

6-1.2 Tensile Force. Each conductor splice joining conductor to conductor, conductor to connectors, and conductor to terminal shall be able to withstand a tensile force equal to at least the value shown in Table 4 for a one minute duration and not break or separate.

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Low Voltage Systems in Conversion and Recreational Vehicles

TABLE 4
TENSILE TEST VALUES FOR CONNECTORS

Conductor Size Gage	Tensile Force Pounds
20	5
18	10
16	15
14	30
12	35
10	40
8	45
6	50

Figure 5: LV Standard 6-1.2 Tensile Force

2.7. Dr. Angle on Pages 51 through 55, in reference to the King fire, misstated that this was caused by a 7-way plug, when the cause and origin could not be determined. There is no basis for this statement. The vehicle was stationary at the mother-in-law's residence and not likely connected to a tow vehicle at the time. The photo, Figure 42 of Dr. Angle's report, depicts a burned RV with the awning deployed, as shown in Figure 6. The 7-way plug would not likely be involved at this point. Dr. Angle is not a Certified Fire and Explosion Investigator (CFEI) nor a Certified Vehicle Fire Investigator (CVFI) and is not qualified to offer this opinion.

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Figure 6: Dr. Angle Figure 42 of the King Fire Vehicle

- 2.8. Dr. Angle on Pages 57 to 77 describes a field investigation. Numerous entries have no reference to where the inspections took place, who he spoke with or any written inspection protocol. Some the inspections included no information on the premise on which he inspected these vehicles. There is no way to corroborate these evaluations, no location, contacts or way to confirm or deny any of the allegations. One photo depicting an arc with no definition of “disturbing” the wires was presented as Figure 76. Did Dr. Angle cause the short depicted and how was it resolved, as this was a vehicle at a dealership?
- 2.9. On Page 79, Dr. Angle presents numerous charts without appropriate legends or criteria used for the vague determinations.
- 2.10. Dr. Angle discusses the 2022 Forest River survey from pages 82 to 125, which Forest River pursued out of an abundance of caution. The discussion culminated in a series of charts that had no legend or criteria used, as well as a flame icon for dramatic affect with no explanation of the meaning of the chart and data provided.

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- 2.11. Dr. Angle discusses Forest River Quality Control, staffing, and hiring practices with no knowledge or basis on page 144. This is speculation, without basis, about the level of training, hiring practices, and the level of electrical engineering and mechanical engineering at Forest River. Dr. Angle exhibited his lack of any experience with on-highway vehicles and recreational vehicles by stating:

Throughout this time, it placed the RVIA Seal and another sticker on each towable RV, incorrectly claiming applicable standard compliance.

Neither RVIA nor the National Highway Traffic Safety Administration (NHTSA) require the removal of a sticker, in response to an alleged non-compliance. Once again, Dr. Angle simply refers to the portion of the federal label, representing the Federal Motor Vehicle Safety Standards (FMVSS) 49 CFR 571.100 – 500, as another sticker. Dr. Angle offers no opinions regarding compliance with the FMVSS, yet states that Forest River incorrectly claimed compliance.

- 2.12. Dr. Angle disagrees with the RVIA auditors, and Forest River on the proper interpretation of the standards developed by RVIA. There is no record of Forest River being cited for non-compliance by the numerous audits of each plant, several times per year.
- 2.13. Dr. Angle's entire focus was on Forest River and not the subject incident, which was the repeated negligent misuse by Mr. Nelson of both the 2019 and the 2020 Puma 5th Wheels.

As a result of my inspection observations, analysis of available materials, along with my education, training, and experience in mechanical engineering and recreational vehicle design and manufacturing, I hold each of these opinions to a reasonable degree of engineering certainty. These opinions may be refined as additional materials become available for inspection or review.

Sincerely,



Jim Keough
Senior Managing Engineer

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Deposition and Trial Testimony of James J Keough, Jr. P.E.

Date	Caption	Depo/Trial/ Hearing	Law Firm	State
Nov-2020	Bartley v Sullair (Troup County, GA 18-CV-0079)	Deposition	Swift Currie	GA
Sep-2021	Kaiser v Jayco, Inc (US District Court, 20-cv-12903)	Deposition	Bowman & Brooke	MI
Dec-2021	Dickson v Unique Concepts (Denton County, TX DC-19-7568-16)	Deposition	Reib Law	TX
Mar-2022	Dickson v Unique Concepts (Denton County, TX DC-19-7568-16)	Trial	Reib Law	TX
May-2022	Ormsby v Nexus RV (US District Court, 3:19-cv-0626-DRL-MGG)	Deposition	Sopko Nhussbaum Inabnit Kaczmarek	IN
Aug-2022	Terry Brown v TICO (Chatham County, GA SPCV20-00258-WA)	Deposition	Savage Turner & Pinckney	GA
Feb-2023	Azzinaro v The Shyft Group USA (US District Court, 2:21-cv-01990-JJT)	Deposition	Bowman & Brooke	AZ
Feb-2023	Isaiah Johnson v TICO (Chatham County, GA STCV1800806)	Deposition	Jones, Boykin & Associates	GA
Mar-2023	Lloyd v Thor (Georgia New Motor Vehicle Arbitration Panel Case Number: 2023-005)	Hearing	Copeland, Stair, Valz & Lovell, LLP	GA
Sep-2023	Albright v TICO (Chatham County, GA STCV19-00982)	Deposition	Savage Turner & Pinckney	GA
Nov-2023	Carpenter v Poulsbo - Arbitration	Deposition	Socius Law Group	WA
Mar-2024	Agin v Thor (US District Court, Arizona 2:22-cv-01713-PHX-MTL)	Deposition	Nelson Mullins	AZ
Aug-2024	Frisk v Poulsbo RV (Skagit County Superior Court, 23-2-00160-29)	Deposition	Tyson & Mendes	WA
Aug-2024	Frisk v Poulsbo RV (Skagit County Superior Court, 23-2-00160-29)	Hearing	Tyson & Mendes	WA

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Engineering & Scientific Consulting

Jim Keough, Jr., P.E.

Senior Managing Engineer | Vehicle Engineering

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Professional Profile

Mr. Keough specializes in the design, development, analysis, and testing of specialty vehicles such as recreational vehicles (including Class A, Class B, Class C, fifth wheels, travel trailers, toy haulers and truck campers), as well as modular homes, ambulances, terminal trucks, buses and street sweepers. He has 32 years of experience in specialty vehicle engineering design, development, sustaining engineering, and quality support for low volume production, including 17 years of engineering management for all aspects of vehicle design and production, such as, Computer Aided Design (CAD), analysis, manufacturing, systems, electrical, production support and customer service support.

Mr. Keough has led the development of RV chassis and terminal truck design from the ground up, with an emphasis on weight distribution, structural analysis, electrical systems, compliance, and testing. He implemented finite element analysis and accelerated durability testing at 5 manufacturers of specialty vehicles. He has experience with the development of slide out systems, including cable, hydraulic, and gear driven systems including full body slides. He also has experience in FMVSS compliance and testing for specialty vehicle applications. He has worked on Magnuson-Moss Warranty Act matters and Song-Beverly Act for California Lemon Law matters. Lemon law experience includes automotive and specialty vehicle applications and Texas and Florida Lemon Law matters. He has worked on Patent and Trade Dress matters.

Academic Credentials & Professional Honors

B.S.M.E., Mechanical Engineering, Purdue University, 1989

Northwestern University Center for Public Safety, Traffic Crash Reconstruction for the Forensic Engineer 2015

Licenses and Certifications

Professional Engineer Mechanical, Arizona, #63992

Prior Experience

Director of Engineering, Capacity Trucks, 2012-2015

Chassis Development Leader, Thor Motor Coach, 2012

Engineering Manager, Norco Industries, 2010-2012

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Engineering Manager, Navistar - Monaco, 2009-2010

Senior Director of Engineering - Monaco, 2003-2009

Engineering Manager, McCoy Miller, 2001-2003

Senior Engineer to Director of Engineering, Coachmen Industries 1989-2001

Professional Affiliations

Purdue University Technical Assistance Program Advisory Council, 2000-2003

Member, Recreational Vehicle Industry Association (RVIA), 1994-2001

- Plumbing Technical Subcommittee
- Fire and Life Safety Technical Subcommittee

Member, Recreational Vehicle Industry Association (RVIA), 2016-Present

- Plumbing Technical Subcommittee
- Fire and Life Safety Technical Subcommittee
- Vehicular Components Subcommittee
- NHTSA Technical Subcommittee

RVIA - NHTSA Technical Subcommittee

President, St. Joseph Valley Chapter of Indiana Society of Professional Engineers, 1992-1994

Publications

Reamer, Keough, et. al - American National Standards Institute, RV Industry Association – Laboratory Test Procedures for Exterior Ladders on Recreational Vehicles. EXTLAD-1. Elkhart, Indiana. (July 15, 2024)

Keough J. A wider margin of safety. Mechanical Engineering 1995; p. 71. Keough J. FEA design process. Computer Graphics World 1994; p. S20.

Keough J. Algor software helps coachmen industries make significant cost reductions – slide out bracket. Algor Design World 1994; p. 1.